USEFUL COCCINELLIDAE FOUND ON THE COMBOYNE PLATEAU.

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(Eight Text-figures.)

[Read 27th September, 1933.]

There are eight species of the family Coccinellidae, commonly called lady-bird beetles, on the Comboyne Plateau, which are of decided economic importance, seven of them being insectivorous and one a vegetarian, but nevertheless useful. They appear first as the perfect insect from September to December, during which time the whole cycle of the new generation is produced in most of them, so that during these four months the eggs, larvae, pupae and imagines appear. After December one seldom sees any of the species, except possibly *Leis conformis*, and that in the adult stage. In a farming community such as this and in fruit-growing areas, it is a very important matter to preserve and encourage any agent which assists in destroying the many enemies of crops, whether cereals or fruit or products of the flower garden, but unfortunately these small beetles are hardly ever studied by the man on the land or, if they are noticed at all, they are looked upon with grave suspicion as being identical with or closely allied to the Pumpkin beetle (*Aulacophora hilaris*) of the family Chrysomelidae and killed on sight.

The species found are as follows: *Leis conformis*, *Coccinella repanda*, *Verania frenata*, *Verania* (*lineola* ?), *Coelophora inequalis*, *Coelophora veranioides*, *Callineda testudinaria* and *Halyzia galbula*.

Leis conformis (Text-fig. 1), measuring 6 mm., is of an orange colour, profusely marked with black spots over dorsal surface of thorax and elytra. This is one of the commonest species and generally appears first in September as an imago feeding on several species of *Aphis*, viz.: *Schizoneura lanigera* (Woolly Aphis) of the apple tree; the *Aphis* infesting the mint of the vegetable garden; *Macrosiphum rosae* (Rose Aphis); *Toxoptera aurantii* (Orange Aphis); *Aphis nerii* (Aphis of Foxglove); and a species of *Psylla* living on *Acacia melanoxylon* (Blackwood Wattle) and probably other Acacias. This lady-bird is rarely seen after January, having by then been through all its stages. The larva, if anything, is more voracious than the perfect insect. The eggs are laid in clumps, are yellow in colour and laid in an upright position on the leaves or stem.

Coccinella repanda (Text-fig. 2), measuring 5·5 mm., is of a general orange colour with two black arrow-head markings on each elytron. This is a common species here in the imago stage during the last three months of the year, at the end of which time the second generation of imagines has made its appearance. It is found feeding on *Macrosiphum rosae* on the rose, on *Toxoptera aurantii* on the orange, on *Aphis nerii* on the foxglove, on *Macrosiphum solanifolia* on the potato, on the *Aphis* on garden mint and the *Psylla* of *Acacia melanoxylon*. On these plants it may be found in any of its stages, the larva being very active as an *Aphis* destroyer.

Verania frenata (Text-fig. 3).—This measures 5·4 mm. long, is of a general orange colour with a broad black line where the elytra meet on the centre of the dorsal surface and another broad black line running longitudinally along the

centre of each elytron with a right-angled projection inwards at the anterior end. These markings are subject to considerable variation. Some specimens have no internal projection of the black line on the centre of the elytron, and sometimes the central line is connected at its posterior end with the broad line in the centre of each elytron. This species is not often seen here. I have found it on foxglove feeding on *Aphis nerii* and only in the month of November.

Verania (*lineola* ?) (Text-fig. 4) measures 4·5 mm., and is a general light flesh colour with no conspicuous markings, except a central narrow dark line at the contiguous edges of the elytra. This is a rare form here, only seen once on a climbing rose bush, feeding on *Macrosiphum rosae*; this was in the month of November.

Coelophora inequalis (Text-fig. 5) is 5·3 mm. in length. The general colour is orange with four small unequal black spots on each elytron and these vary somewhat in size and shape in different specimens. It is a fairly common species found in adult form feeding on the *Aphis* of rose plants (*Macrosiphum rosae*), of foxglove (*Aphis nerii*), of mint, and on the *Psylla* of *Acacia melanoxylon*; it is found from September to November.

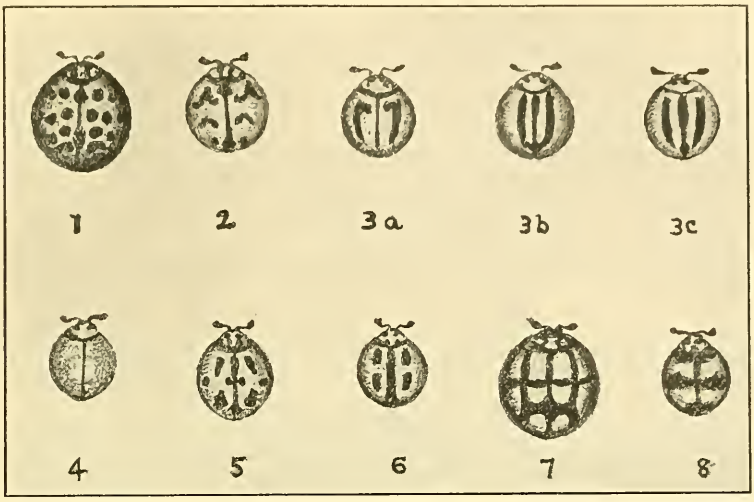
Coelophora veranioides (Text-fig. 6) is slightly smaller than *C. inequalis*, being 5·0 mm. Its general colour is orange, with a central black line including the inner edges of both elytra and a broad uneven broken line longitudinally through the centre of each elytron parallel to the central line so that each broken line appears as two stripes in the same line with an interval between them. This is a rare form here, found as imagines only and in September and October, feeding on *Toxoptera aurantii* of orange and *Macrosiphum rosae* of rose.

Callineda testudinaria (Text-fig. 7) is the largest of all the species under consideration, measuring 6·8 mm. This is a fairly common form, seen first as imago in September, and in all its stages during the succeeding two or three months. It is extremely variable in its markings; of a general biscuit colour with each elytron divided by narrow or wider black lines into five squares; sometimes the dividing lines are barely, if at all, visible, at others they are broad and well defined. Its food consists of *Macrosiphum rosae* on the rose, *Toxoptera aurantii* of the orange, *Aphis nerii* of foxglove, the *Aphis* of mint, and the *Psylla* of *Acacia melanoxylon*.

Halyzia galbula (Text-fig. 8) measures 4·5 mm., is a bright canary-yellow colour with two broad wavy black bands transversely across elytra, the anterior one including the contiguous parts of thorax and upper edges of elytra, the second posterior to it and passing transversely across elytra about their middle, also a black spot covering tips of elytra in middle line at posterior end when these are closed. This species, unlike all the others, feeds on the *Oidium* (Mildew) which attacks the leaves of rose plants. This is a vegetable fungus which does great harm to rose plants, especially the smaller-flowered climbing varieties. I have also found it on grape vines, evidently feeding on a fungus attacking their leaves. On one occasion in another district I found several on a grape vine which was infested with the larvae of *Phalaenoides glycine* (Vine Moth), which were just hatching from eggs, and very young forms. I have always suspected that they were feeding on these larvae but it was only circumstantial evidence, for I did not see the lady-birds actually eating the larvae, though they were on the same leaves and the larvae had all disappeared in a few days.

If any of these species of beetles are in any numbers on an infested plant it is a mistake to spray, as this method will certainly destroy the very agent

which will clean up the pest in a much more thorough and efficient manner if left alone.



Text-figures 1-8.
1. *Leis conformis.* 2. *Coccinella repanda.* 3*a*, 3*b* and 3*c*. Various forms of *Verania frenata.* 4. *Verania* (*lineola* ?). 5. *Coelophora inequalis.* 6. *Coelophora veranioides.* 7. *Callineda testudinaria.* 8. *Halyzia galbula.* × 2.

There are several beetles liable to be confused with these useful species. One that should not be is the Pumpkin beetle, the only point of resemblance being the black markings on an orange ground, but in every other particular, especially in its shape, it differs considerably, being a long oval as against the rounded form of the Coccinellid; also in consistency, the Pumpkin beetle being much softer, especially the elytra, and more easily crushed. Another genus of the family Chrysomelidae is *Paropsis* which very closely resembles the species of Coccinellidae in general form but differs in having four-jointed tarsi while the latter has the tarsi three-jointed. The members of the genus *Paropsis* are leaf-eaters. Among the Coccinellidae themselves there are vegetable feeders, for example, some species of the genus *Epilachna* are vegetable feeders, some of them very injurious in the vegetable and flower garden: *Epilachna 28-punctata* feeds on the leaves of Solanaceous plants including the potato, tomato, and other Solanaceae. This species is about the same size as *Leis conformis* and marked in orange and black in a very similar manner and may easily be mistaken for the latter, but *Epilachna* is covered with a silky pubescence while *Leis* is smooth and shiny.

The dimensions given above are the actual measurements of specimens I had in my possession, but they are subject in all to a wide range of variation. In colour, too, they vary considerably. Those that I have spoken of as orange vary from yellow through orange to almost bright red.

My thanks are due to Mr. E. H. Zeck, Assistant Government Entomologist, and to Mr. H. J. Carter and also to the late A. M. Lea, Entomologist to the Adelaide Museum, for identification of specimens.